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STRESS AND DEEP STRUCTURE.

BY- SWIFT, LLOYD B.

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IN ANALYZING WAYS BY WHICH VARIOUS LANGUAGES SIGNAL THE RELATIVE IMPORTANCE OF ELEMENTS IN A SENTENCE, ONE APPROACH (THAT OF TRANSFORMATION THEORY) IS TO RELATE EMPHASIS TO A TOPIC-COMMENT RELATIONSHIP. A COMPARATIVE ANALYSIS OF SEVERAL ENGLISH, TURKISH, AND JAPANESE SENTENCES THAT TAKE DIFFERENT PATTERNS OF EMPHASIS SUGGESTS THAT IN EACH CASE THE SPEAKER MUST CHOOSE WHICH ELEMENT IS THE TOPIC AND WHICH IS A COMMENT ON THE TOPIC. THIS CHOICE OF TOPIC-COMMENT STRUCTURE IS COMMON TO MANY LANGUAGES, AND IN SOME LANGUAGES THE SIGNALS OF THESE RELATIONSHIPS ARE AN IMPORTANT PART OF SYNTACTIC STRUCTURE. FOR EXAMPLE, THIS RELATIONSHIP IS SIGNALED IN ENGLISH BY RELATIVE STRESS, IN TURKISH BY WORD ORDER, AND IN JAPANESE BY SEPARATE MORPHEMES. OF THE SEVERAL WAYS OF ANALYZING THIS PHENOMENON, ONE (THE TAGMEMIC APPROACH) IS TO ALLOW THE DEEP STRUCTURE TO DEVELOP BOTH A TOPIC-COMMENT STRUCTURE AND AN INDEPENDENT PHRASE STRUCTURE. ALTHOUGH A SENTENCE MAY HAVE IDENTICAL TOPIC-COMMENT STRUCTURE AND PHRASE STRUCTURE MARKERS, A NUMBER OF UNIQUE COMPOSITE DEEP STRUCTURES MAY RESULT FROM MAPPING THE PHRASE STRUCTURE ONTO THE TOPIC-COMMENT STRUCTURE IN DIFFERENT WAYS. THIS PAPER WAS PRESENTED AT THE UNIVERSITY OF KENTUCKY FOREIGN LANGUAGE CONFERENCE (20TH, APRIL 29, 1967). (JD)

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STRESS AND DEEP STRUCTURE

LLOYD B. SWIFT

Foreign Service Institute
U.S. Department of State
Washington, D.C.

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The title of this paper, forwarded to the hosts for this conference last fall, is somewhat of a misnomer. What I am here concerned about is the deep-structural nature of such matters as relative emphasis and the relationship called Topic-Comment. Stress itself is the phonological correlate of emphasis in some languages and under certain circumstances. I am not here concerned with the phonological phenomonon known as stress, but rather with the ways in which various languages signal emphasis and with some suggestions for the elaboration of theory to account for these matters.

In his MIT monograph, Intonation, Perception and Language (1967) which came to my hand but recently, Lieberman says that emphasis is prominence not predicted by the stress rules of the phonological component and that it may result from the presence of an emphatic morpheme in the underlying deep phrase marker (p.146). My purpose here is to show how the generation of such a deep-structural emphatic morpheme may be related to the Topic-Comment concept and the demonstrate, with examples from three languages, ways in which such an emphatic element in the deep structure results in different surface correlates.

My particular area of interest for some years has been Turkish. There seems now to be rather general agreement concerning the facts of Turkish word-stress placement as evidenced in Lees' Phonology of Modern Standard Turkish, my own Reference Grammar of Modern Turkish and Bob Meskill's two Texas dissertations on the suprasegmentals and the transformational syntax of Turkish. But, as Meskill says in his doctoral dissertation, the intricacies of the relation of pitch contours to syntactic patterns remain to be worked out for Turkish.

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I doubt if these matters have been worked out for any language. I believe the reason for this is that nobody has to date defined deep structure deeply enough and nobody has yet demonstrated how, in fact, the province of the base component of a grammar can be expanded to include enough of what we have often called semantics to actually do what Chomsky and Postal and others say the base component must do -- which is to provide all the structural data required for a full semantic interpretation.

The difficulty, as Chomsky very clearly indicates in various places in Aspects of the Theory of Syntax, is to determine the relations which must, in fact, be defined in the base component of a grammar if it is to be the sole source of the semantic interpretation of a sentence -- or discourse -- or whatever unit is required. Chomsky states, as do the tagmemicists that these relations are 'grammatical' and illustrates with such concepts as 'subject-of', 'object-of' etc. which everybody will accept as grammatical -- narrowly defined -- and as syntactic relations, not semantic ones.

But on page 163, in his discussion of the boundaries between syntax and semantics, Chomsky cites an interesting case from Cook Wilson (1926) concerning the statement Glass is elastic.

In the two possible readings of that sentence: Glass is elástic. and Gláss is elastic., Wilson observed what he interpreted as a shift of 'subject' from glass to elasticity. Chomsky speaks of the grammatical subject as compared to the logical or psychological subject and observes that 'whatever the force of such observations may be, it seems that they lie beyond the scope of any existing theory of language structure or language use.'

It seems clear to me that in the sentence Glass is elástic. glass is the topic concerning which elasticity is the comment while in Glásss is elastic. elasticity is the topic and glass is the comment.

Chomsky, on page 221 of Aspects, has a footnote on Topic and Comment in which he suggests that Topic be allowed to refer to the leftmost NP in the surface structure immediately dominated by 'S', but this is clearly inadequate to explicate the Glass is elastic examples, since in the reading Glásss is elastic the topic -- elasticity -- is neither leftmost nor an NP in the surface structure.

In their discussions of English sentences (and others,too) transformational linguists generally assume what they call 'colorless' stress-intonation patterns. It seems to me that no stress-intonation pattern which can be placed on this glass-elastic example can be so described or, at least, that we need to set up some formal criteria for such a designation as 'colorless'.

Lot's take another very simple English sentence -- the greeting How are you? This sentence cannot be pronounced with a 'colorless' intonation-stress pattern. It's either How ARE you? or How are YOU? -- or possibly some other much less common reading. It is said that the first of these can only be said by the initiator of a conversation and the second by either participant, and this is probably true, but the reason for these restrictions must be sought in the relation of the Topic-Comment structure (signalled by the stress-intonation patterns) to the external social situation. In other words, it seems to me that this, too, is a matter of topic and comment, signalled by prominence, and that the speaker is somehow constrained by the grammar and the external situation to choose or or another reading.

What I am here suggesting, then, is that in English at any rate, an interestingly large number of sentences involve emphasis marked by stress (or to use Lieberman's term -- 'prominence') as a signal of what I call Topic-Comment relationship and that a speaker is constrained by the grammar to make a choice between alternatives in this respect.

Now I shall try to demonstrate, by reference to other languages as well as to English, that this matter of topic-comment structure is common if not universal in human language and that most languages in fact force a speaker to make such choices, that in some languages the signals of these relationships are very clearly matters of the syntactic component of their grammars, that the syntactic component of English and other languages must, if all the signals required for a full semantic interpretation are to be present, contain specifications of these relationships, and that theory must be expanded to account for these matters.

In my Turkish grammar (1963) -- a taxonomic grammar -- I stated that 'successive segments of an utterance, whatever the [phrase structure] relationships signalled by suffixation patterns, are topics to which succeeding segments within the utterance are comments.' I was, and am, aware that Topic-Comment structure in Turkish is not that simplistically linear — but that is a matter of embedding and the case for the simple sentence is as I have stated it. I pointed out with a number of examples ways in which, in Turkish, shifts of marked elements within the surface word-order of a sentence, often accompanied by stress-intonation shifts as well, signal shifts in the Topic-Comment structure of the sentence. Item A on your handout gives some examples of such shifts. A1 through A4 exhibit word-order shifts. A5 and A6 are included to show that Topic-Comment shifts may also, in simple sentences, be associated with matters other than word-order. But our concern

here is primarily with A1 through A4 and their translations.[READ]

Meskill in his Texas dissertations gives rules in the transformational component of the grammar to provide, with appropriate constraints of context, for some shifts of word-order and of stress -- though not exactly the ones here exemplified. He, of course, accepts one word-order and one stress pattern as canonical (or 'colorless') and writes his rules in terms of shifts from these. Note that he does this in the transformational component. But theorists now maintain, quite cogently, that the transformations are not permitted to introduce meaning-bearing elements. Stockwell, in a lecture at FSI, used the sentences: He used a knife to cut the salami. and He cut the salami with a knife. as examples of the kinds of problems of obvious semantic relation between sentences which cannot be handled in the transformational component because of the constraint that that component may not introduce such content words as 'used' in the example. Chomsky lists a number of similar pairs.

I submit that the distinction between, for example, sentences A1 and A2 on the handout -- a distinction which I call a difference of Topic-Comment structure -- is just as much an introduction of new meaning into the sentence as would be the selection of a suitably worded paraphrase, and should be subject to the same constraint -- that it cannot be introduced in the transformational component of the grammar.

The two ways out of this problem are to relax the constraint -- which would open a Pandora's box -- or to permit the base component to generate in some way the Topic-Comment distinction.

Just last Friday (April 21) after this paper had been drafted and tried out on my FSI colleagues, I received a xerox of a draft of a chapter of a dissertation currently being worked on at UCLA. In the chapter, Terence Moore

treats at length what he calls 'The Topic-Comment Function and a Problem of Insufficiency in Deep Structure'. It is an interesting confirmation of what I have been saying, that he also concludes that the assignment of Topic-Comment must precede the transformational component.

Let us also briefly look at the few sentences from Japanese printed as item B on the handout. Here B_1 and B_2 illustrate the use of wa and ga to mark the grammatical subject as, respectively, Topic and Comment. B_3 and B_4 are introduced merely to show that the pitch pattern normally found on sentences with ga also occurs on wa sentences and thus the intonation and the wa-ga , Topic-Comment marker, operate at least partially independently.

Note that the introduction of particles (wa or ga) into the Japanese sentences, the shifts of word-order in the Turkish, or the stress-intonation differences on the English translations of Item A are not what the transformational component is precluded from doing. Transformations can provide the mechanism of such shifts, but they are precluded from motivating them -- that is, from introducing the meaning elements which alone can account for the choice of one or another of these alternatives.

Liberman, in the monograph referred to, suggests that the segmental surface-structural feature which he calls prominence can follow from the presence of emphatic elements in the deep phrase marker. That is in English. I think I have demonstrated with the Turkish and Japanese examples that emphasis can also be marked in the surface structure by matters of word-order and of the selection of particles. It remains to explore briefly the nature of the mechanisms in the deep structure which result in the insertion of a morpheme of emphasis which, by processes different for each example language, result in surface-structure manifestations -- prominence, word-order or particles -- and possibly other devices in other languages.

One possible mechanism -- an essentially tagmemic solution to the problem -- is to do what is done in items C through H on the handout for Turkish examples A1 through A-4. Here we allow the deep structure to develop a Topic-Comment structure (Item C) and an independent phrase structure (Item D) for these sentences. Note that the Topic-Comment structure and the Phrase Structure markers are the same for all four sentences. Now the phrase-structure is mapped onto the Topic-Comment Structure (the reverse would also be possible) in such a way that it can be said [see Item E] that in sentence A1 the Topic of the Sentence is manifested by the NP of S (which is, of course, the subject by Chomsky's definition of the subject-of relation), while [see Item G] in sentence A3 the Topic of the Sentence is manifested by the complement of the VP (which, again, could be defined functionally by its position relative to the dominating node in the Phrase Structure.) Similarly the other nodes of the Topic-Comment structure are manifested by various nodes of the Phrase Structure in such a way that each of the sentences A1 through A4 (and several others which would be possible with the same segmental components) has a unique composite Deep Structure resulting from the mapping of the Phrase Structure onto the Topic-Comment structure in a unique way.

Certain other possible solutions have been suggested during discussion of these matters at the Foreign Service Institute. One is illustrated in Items I, J and K of the handout where the substantive nodes in the Phrase Structure are permitted to develop a bifurcation into the dummy symbol -DELTA- and the residue, where the dummy symbol stands for the morpheme of emphasis. The structural index of this morpheme will specify that it can be, withing a single #S# with n emphasis-accepting nodes, represented by n-1 degrees

of emphasis such that only one occurrence of a single degree is permitted. We can designate these degrees of emphasis as E, E-1, E-2 etc. Item K now represents the ordering of the emphatic elements (E, E-1, etc.) selected to replace the dummy symbols in the deep structure of the four sentences A1 through A4. Note that this ordering is the same for the Turkish and the English examples. This is appropriate since, if there were a difference at this point of the deep structure, there should also be a difference of meaning and the English would not be a proper translation of the Turkish. The transformational part of the syntactic component can now take care of the mechanisms which result in the assignment of word-order to the Turkish surface structure and/or prominence in the English surface structure as the correlates of the deep-structural emphasis.

Native speaker intuition, incidentally, accepts A1 in either language as the 'colorless' or perhaps 'least colorful' reading. This is the sentence in which, in the tagmemic solution, the topic-comment and phrase structures are most nearly isomorphic and in which, in the dummy-symbol solution, the Es are numerically ordered from top to bottom of the tree (E-2, E-1, E). This procedure might suggest a way in which colorless or canonical emphasis patterns might be established whether their surface-structural correlates are prominence, word-order whifts, particles or whatever.

Another colleague has suggested that the emphatic element could be introduced by positing two sentences in the deep structure -- say:

Ali went to Ankara yesterday. and It was Ankara.

which, when combined with appropriate delection of certain redundancies could transform the double occurrence of Ankara into Ankara plus emphasis.

This does not account for the several degrees of emphasis exhibited by the example sentences. To do so would require the introduction of more sentences like, say: It was yesterday. and we would be again faced with the problem inherent also in the dummy symbol solution -- namely: what is the mechanism whereby one part of the phrase-marker is now assigned (E) and now (E-1) etc.? In the multi-sentence proposal we are left with the necessity of accounting for the selectional process which orders the sentences as they are combined so as to provide now major emphasis on Ankara and secondary on yesterday and now the reverse.

Thus I return to the so-called tagmemic solution as the one which best accounts for the data. The final alternative -- to allow what I have called Topic-Comment relation to be part of the semantic interpretation rather than of the base structure -- is to retreat from the field saying that matters of emphasis marked by surface stress or word order or particles are matters of 'what the speaker wanted to say' and cannot be handled by syntax. If this is so, then the base component is precluded from generating all the structural signals and the semantic component is more than purely interpretive.

It is not the intent of this paper to suggest that Topic-Comment structure is the only deep structural component which must be matched up with the Phrase Structure to provide for emphasis. It is quite possible that there are, in fact, other sets of relations having to do, for example, with contrastic emphasis -- the domain of which is normally greater than the sentence -- which must also be handled in the deep structure and which might result also in degrees of emphasis. What I have attempted to demonstrate is that matters of emphasis, which in many languages have phonological manifestations in stress-intonational differences, and which arise from such

Deep-Structural relations as Topic and Comment do, in fact, have to be specified in the Deep Structure phrase markers of the sentence if those markers are to provide all the data required for the semantic interpretation of the sentence.

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A. Turkish Examples:

1.	$\overset{2}{\text{Ali}}$ | dün | $\overset{3}{\text{Ankara'ya}}$ $\overset{1}{\text{gitti}}$ #	Ali went to ANKARA yesterday.[1]
2.	$\overset{2}{\text{Ali}}$ | Ankara'ya | $\overset{3}{\text{dün}}$ $\overset{1}{\text{gitti}}$ #	Ali went to Ankara YESTERDAY.
3.	$\overset{2}{\text{Ankara'ya}}$ | dün | $\overset{3}{\text{Ali}}$ $\overset{1}{\text{gitti}}$ #	ALI went to Ankara yesterday.
4.	$\overset{2}{\text{Dün}}$ | Ankara'ya | $\overset{3}{\text{Ali}}$ $\overset{1}{\text{gitti}}$ #	ALI went to Ankara yesterday.
5.	$\overset{2\ 3}{\text{Ali}}$ $\overset{1}{\text{gitti}}$ #	ALI went.
6.	$\overset{2}{\text{Ali}}$ | $\overset{31}{\text{gitti}}$ #	Ali LEFT.

B. Japanese Examples:

1.	Kore wa a⌈ka⌉i desu.	This is RED.
2.	Ko⌈re ga aka⌉i desu.	THIS is red.
3.	Are wa ⌈na⌉ñ desu ka?	What's that?
4.	A⌈re wa na⌉ñ desu ka?	What's THAT?

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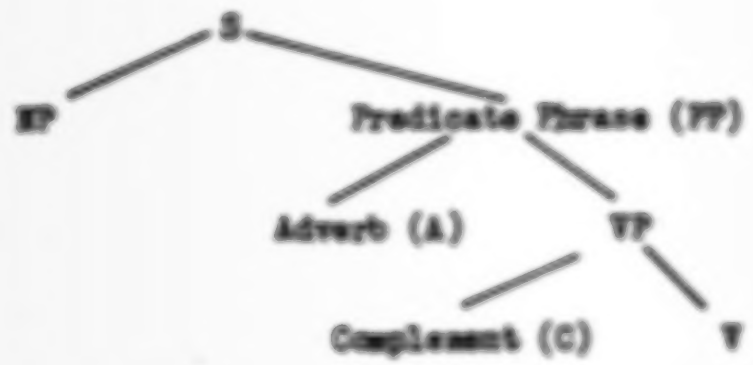
1. In the translations CAPITALIZATION indicates a major emphasis, underlining a secondary one. These matters are impressionistic and I do not pretend to have made an analysis of their acoustic or articulatory correlates. (cf., however, Lieberman, Intonation, Perception and Language, MIT, 1967.)

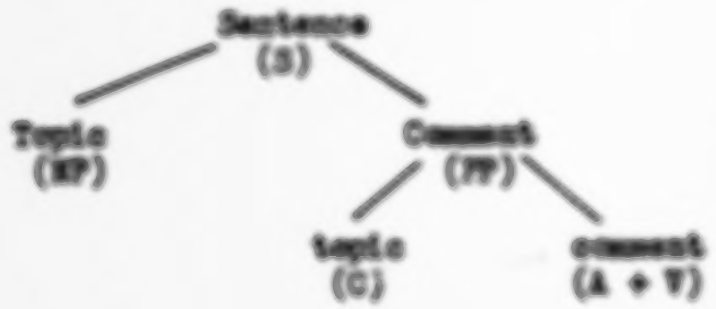
C. Topic-Comment Structure of Turkish Examples:

D. Phrase-Structure of Turkish Examples:

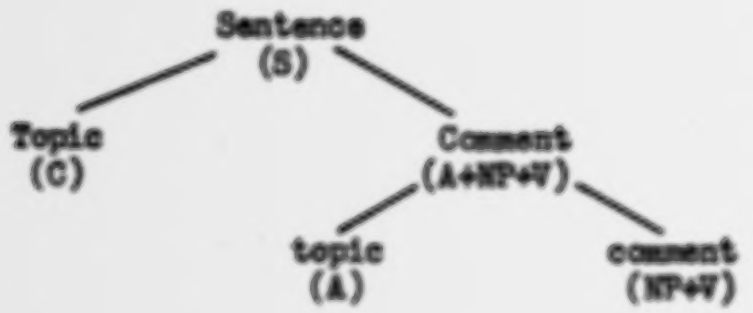


E. Composite Structure of A:

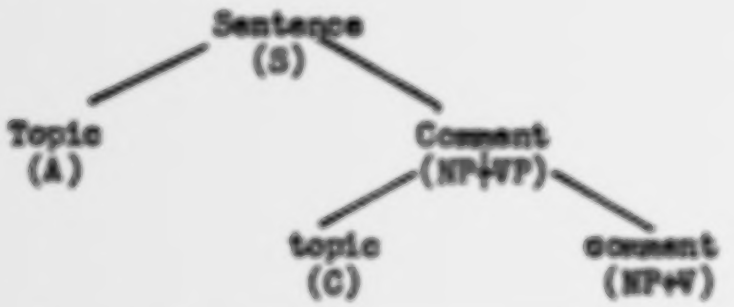
F. Composite Structure of A:



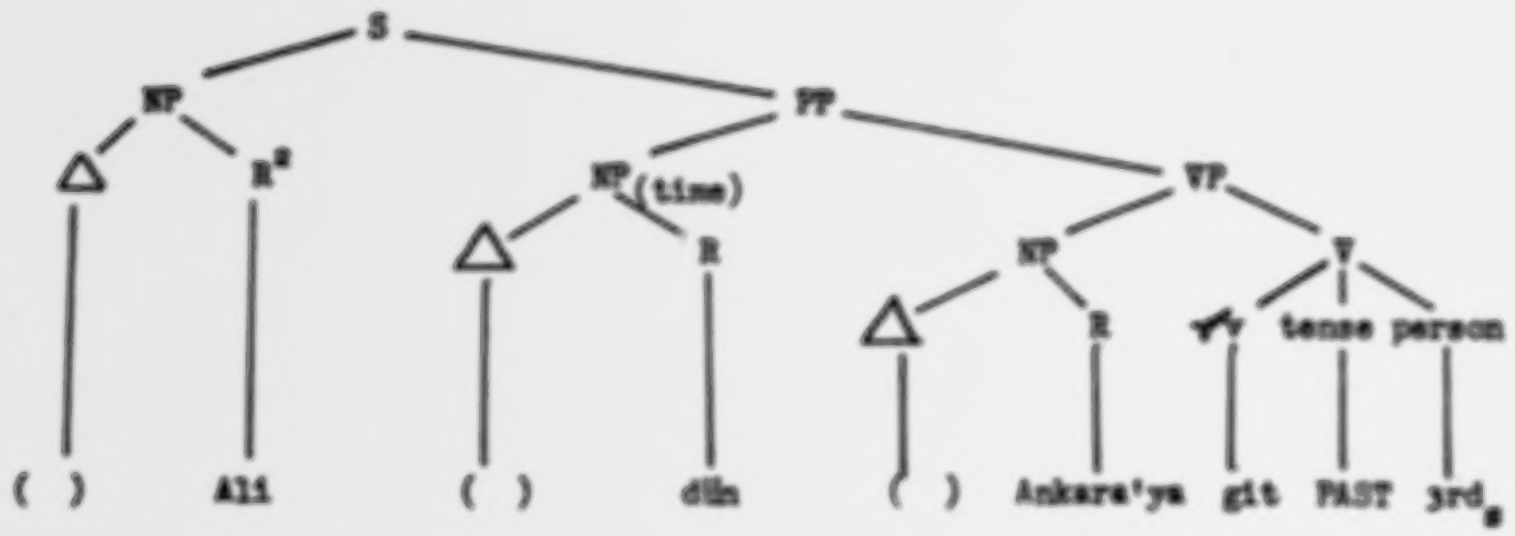
G. Composite Structure of A3



H. Composite Structure of A4

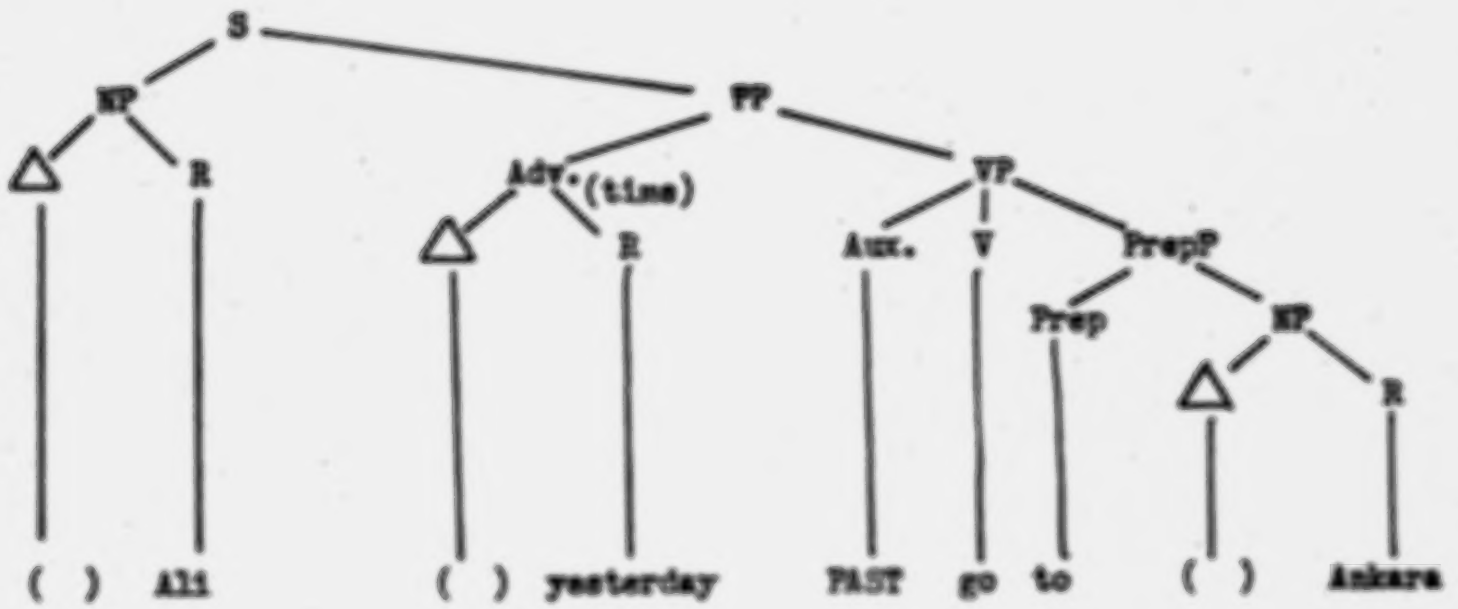


I. Alternative Deep Structure of Turkish Examples:



2. R = residue of nodal element after removal of emphasis.

J. Possible Deep Structure of English Translations of A1-4:



K. Order of Selection of Emphatic Elements Sentences A1-4:

A1 (E-2)	(E-1)	(E)
A2 (E-2)	(E)	(E-1)
A3 (E)	(E-1)	(E-2)
A4 (E)	(E-2)	(E-1)